

Diversity and change in Glasgow's Social and Built Environment

Dr Jonathan Minton
AQMEN Research Fellow
University of Glasgow

Jonathan.Minton@Glasgow.ac.uk

Acknowledgements

- Gwilym Pryce, AQMeN
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- Ade Kearns, GoWell

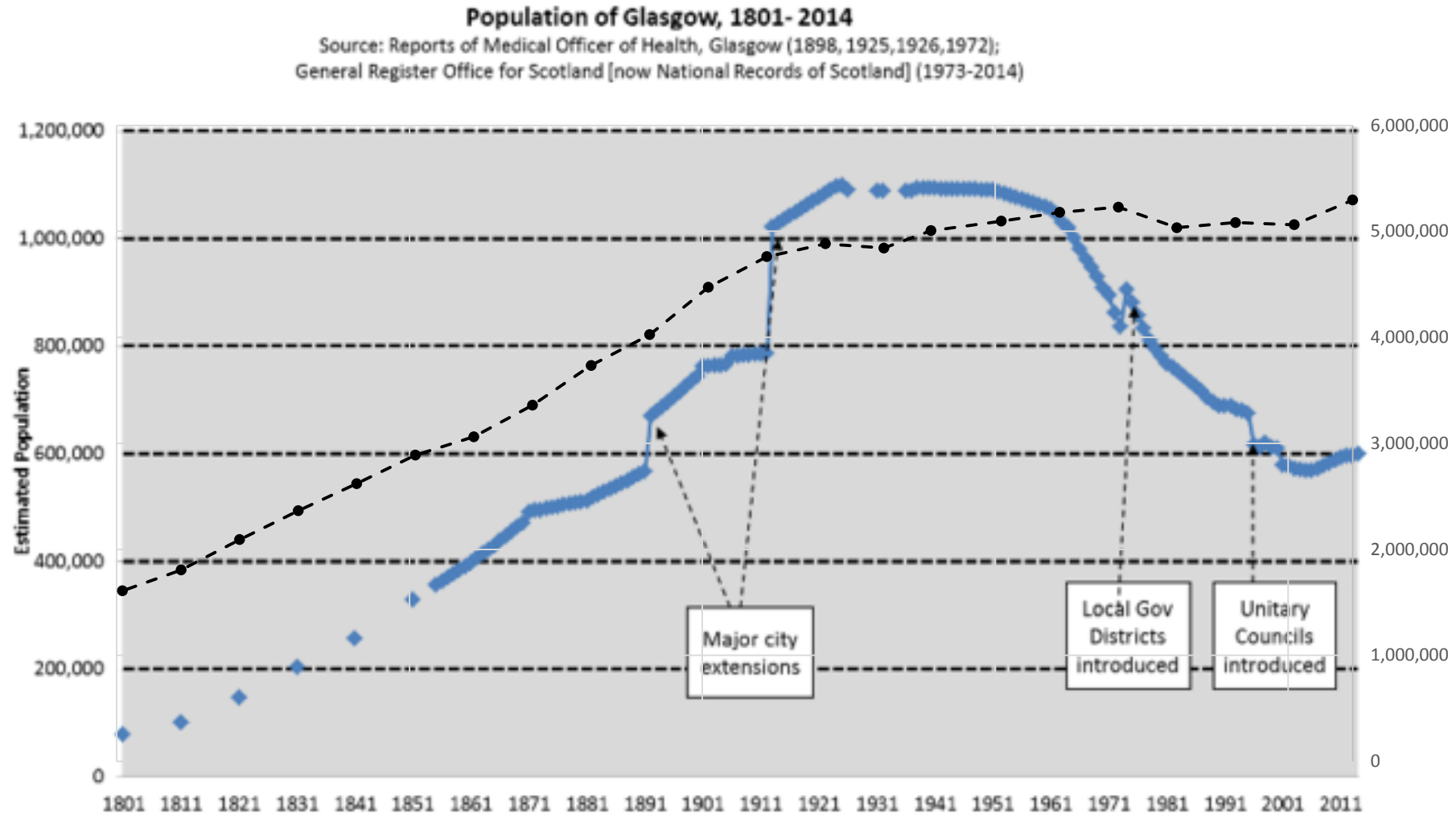
Some caveats/warnings

- I tend to work from **data to theory**
- I *won't* try to 'prove' anything
- And I *will* speculate.

Core idea about diversities of space, place and people

- Core idea 1:
 - Only a limited range of urban forms tend to support high socioeconomic and cultural diversity
 - i.e., those supportive of relatively high density
 - Therefore, low diversity of housing stock -> high diversity of socioeconomic attributes?
- Core idea 2:
 - Density brings network effects and more opportunities for socioeconomic diversity
- Core idea 3:
 - Cities have centres, cores, and underlying effective urban functional geographies
 - Distance/diversity relationships
- Core idea 4:
 - The period 2001-2011 saw rapid sociodemographic change in Glasgow and elsewhere in the UK

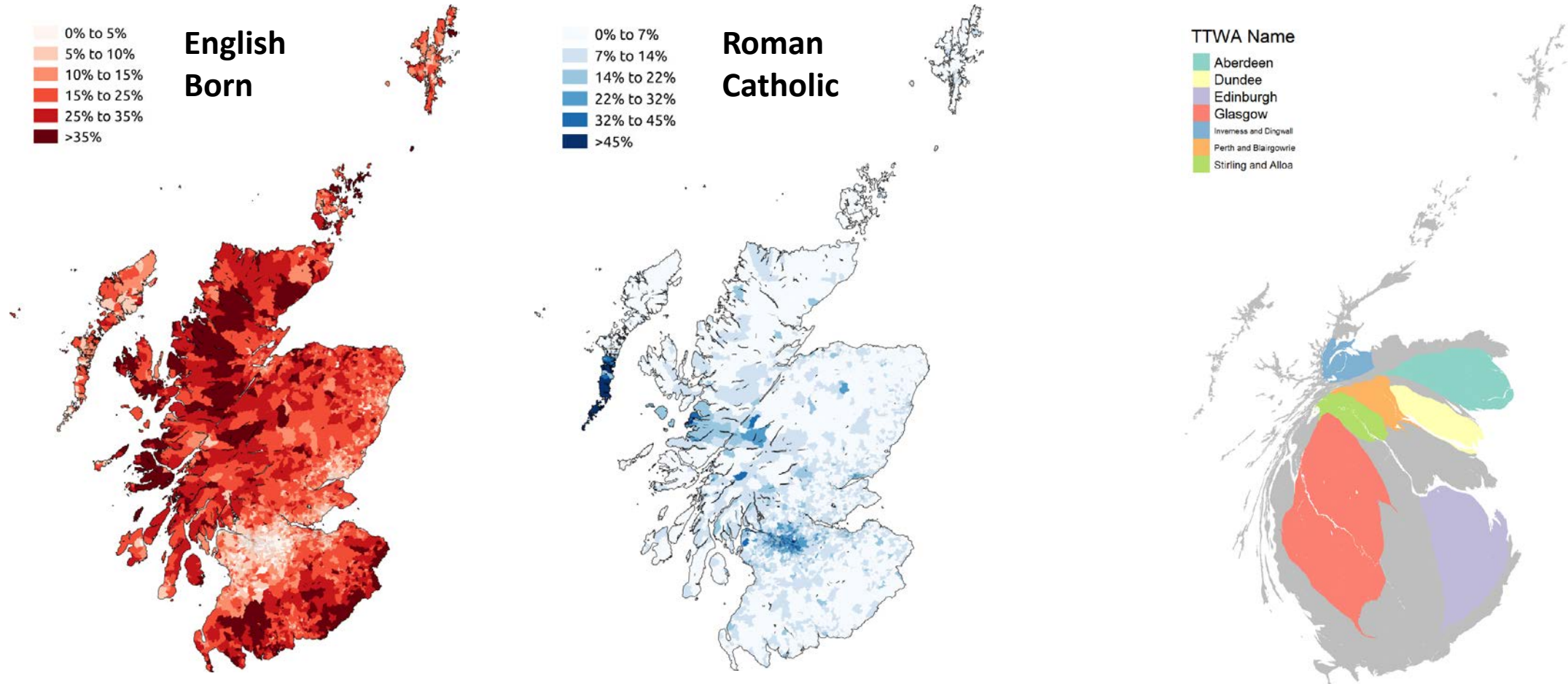
Background – History of Greater Glasgow



http://www.understandingglasgow.com/indicators/population/trends/historic_population_trend

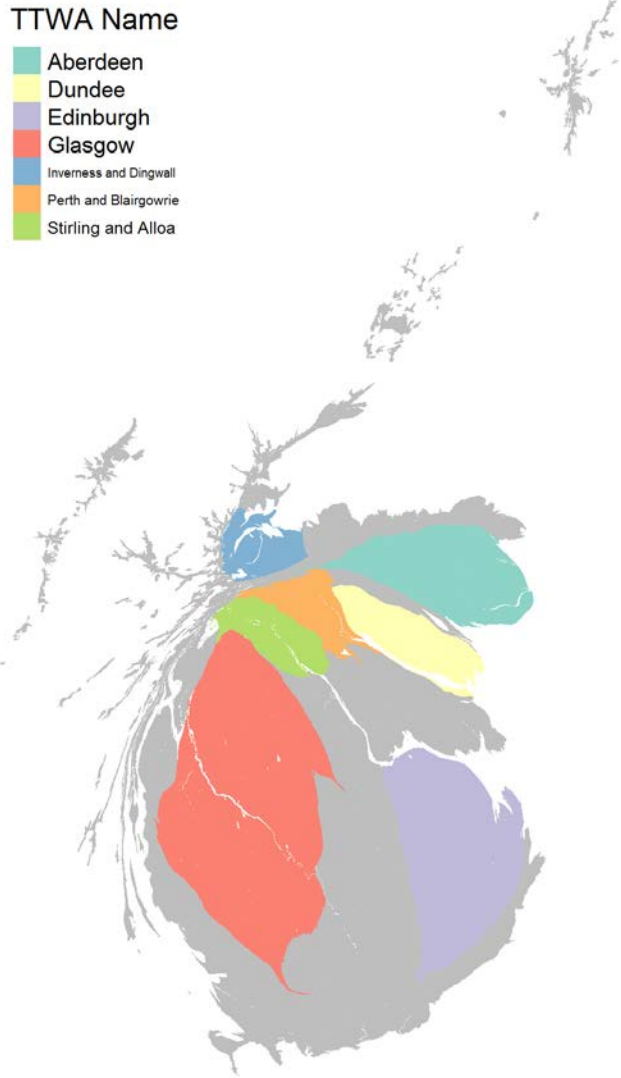
https://en.wikipedia.org/wiki/Demography_of_Scotland

Background – Recent change in GG, rest of Scotland, rest of the UK

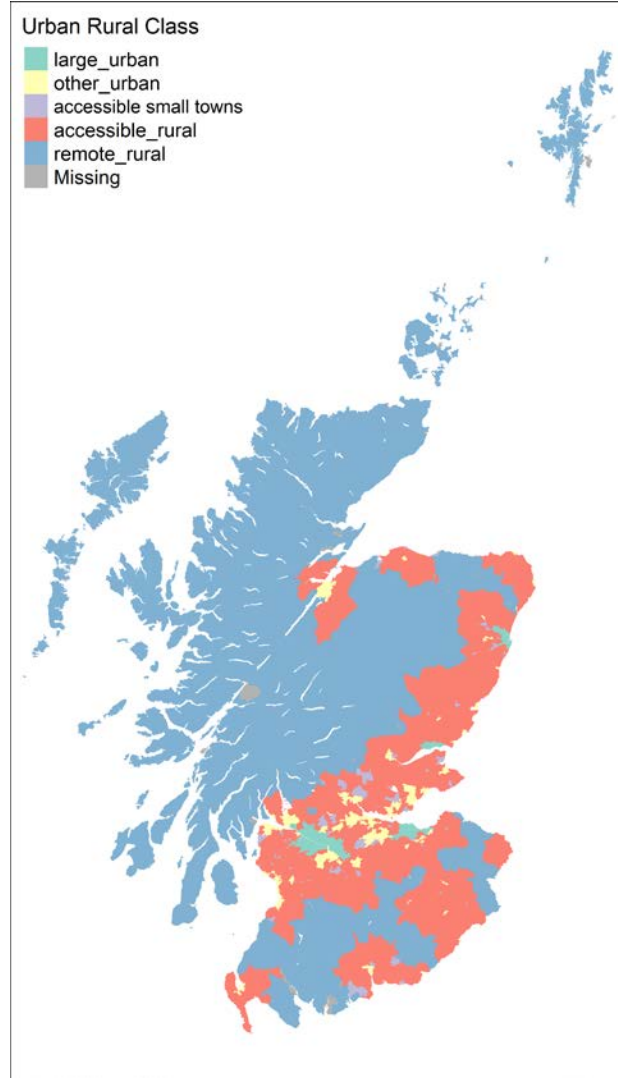
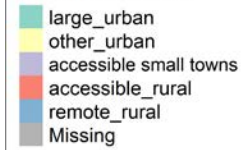


Theories – urbanisation and suburbanisation

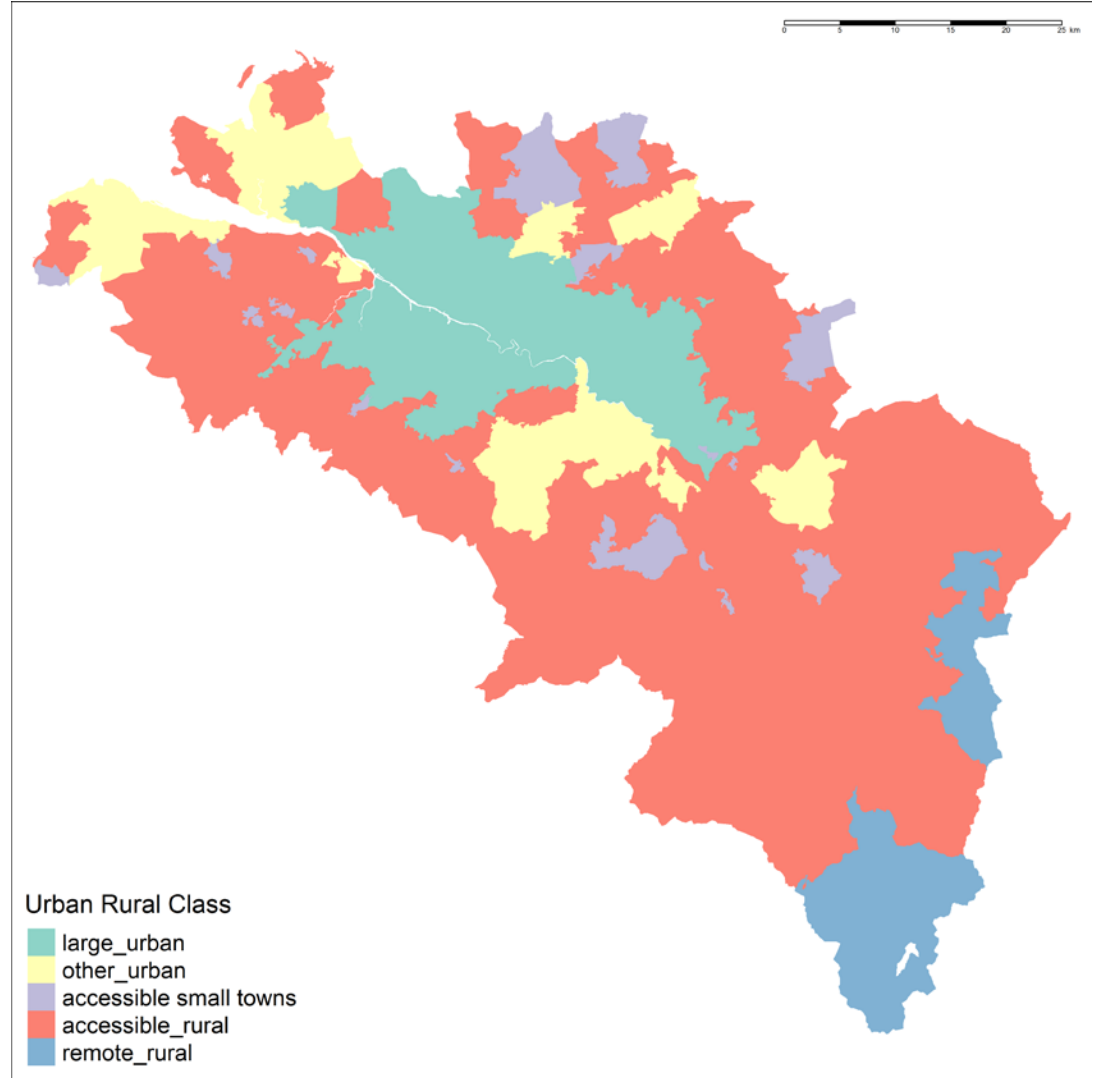
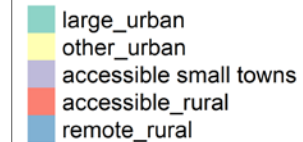
TTWA Name



Urban Rural Class



Urban Rural Class



Theories – Housing and urban design

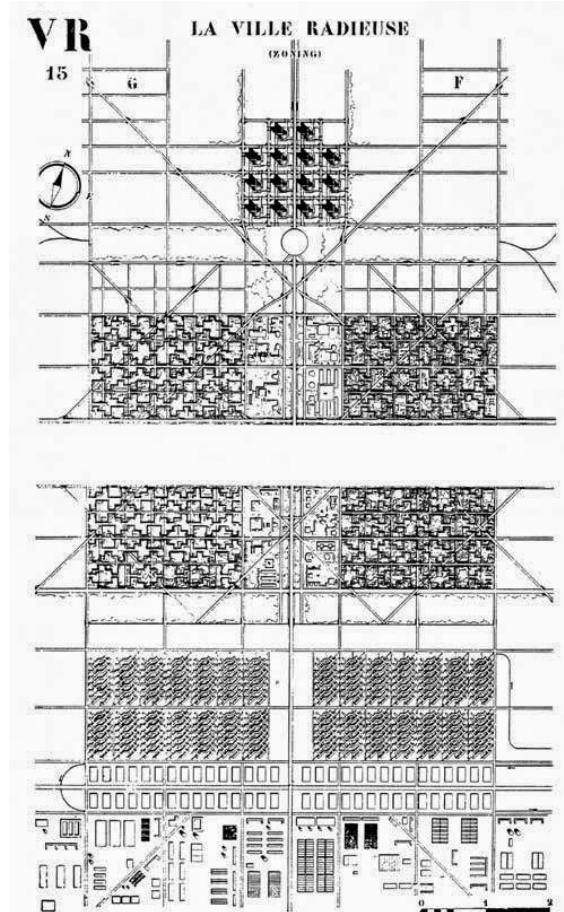
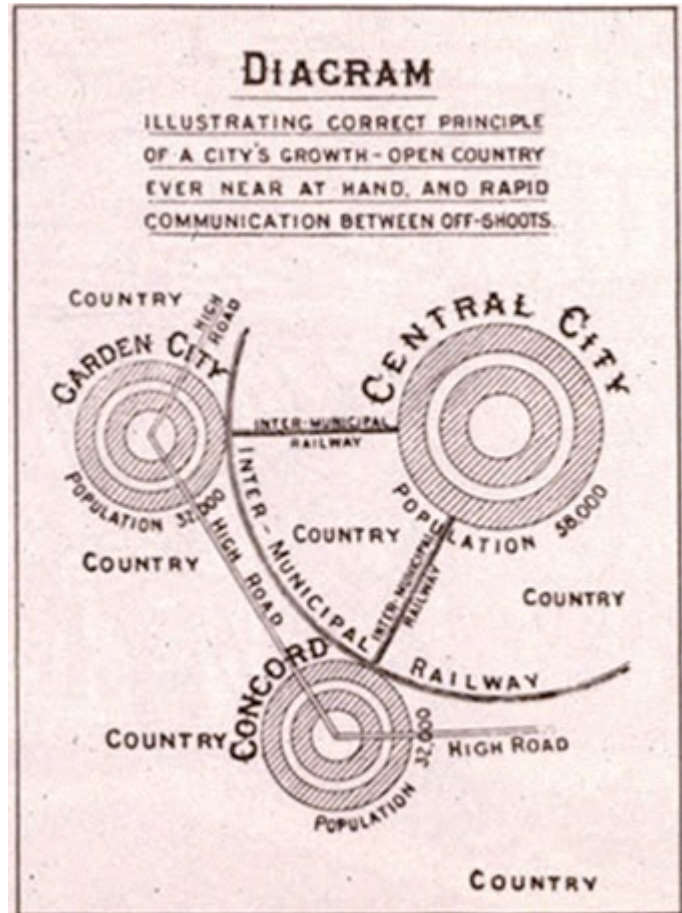


https://en.wikipedia.org/wiki/Hutchesontown_C



http://urbanglasgow.co.uk/archive/glasgow-in-the-1970s-clyde-to-townhead__o_t__t_1281.html

Theories – Housing and urban design



Theories – Housing and urban design



<http://www.glasgows-motorways.co.uk/timeline/4591549029>



<http://www.glasgows-motorways.co.uk/the-m8-motorway/4588285335>

Theories – Housing and Urban Design



https://en.wikipedia.org/wiki/Housing_in_Glasgow

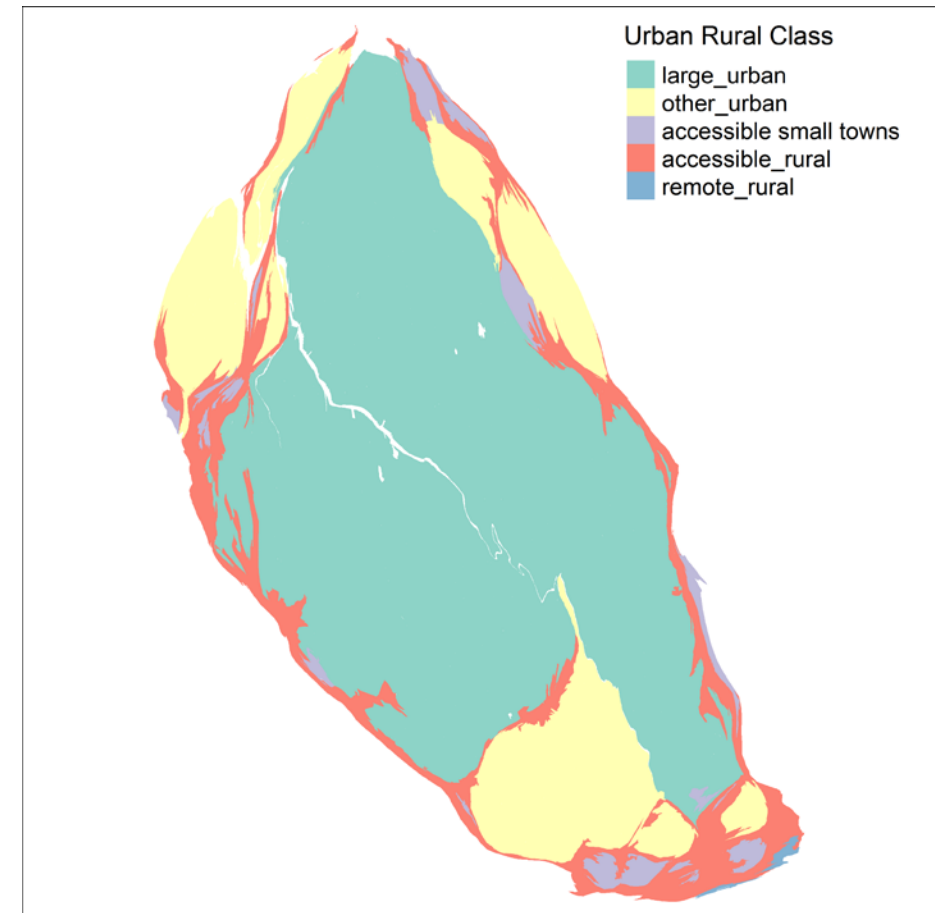
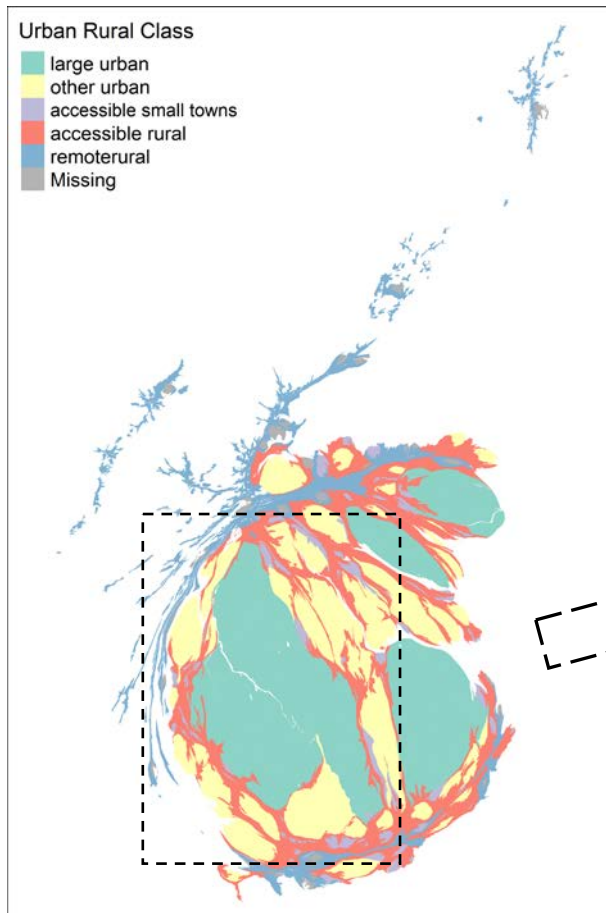


https://en.wikipedia.org/wiki/High_Street,_Glasgow

Theories – Housing and Urban Design



Theories – Network effects and functional geographies



Theories – Relationship between the physical, the social, and the economic

Travel to work area	Proportion		Rank		Rank Change
	2001	2011	2001	2011	
Glasgow	0.037	0.076	1	1	0
Edinburgh	0.032	0.065	2	2	0
Dundee	0.027	0.045	3	5	2
Aberdeen	0.021	0.054	4	3	-1
St Andrews and Cupar	0.015	0.047	5	4	-1
Livingston and Bathgate	0.014	0.025	6	7	1
Kirkcaldy and Glenrothes	0.013	0.021	7	8	1
Stirling and Alloa	0.012	0.026	8	6	-2
Lanarkshire	0.011	0.020	9	10	1
Dunfermline	0.011	0.019	10	11	1
Shetland Islands	0.010	0.015	11	15	4
Falkirk	0.010	0.019	12	12	0
Inverness and Dingwall	0.010	0.018	13	13	0
Perth and Blairgowrie	0.010	0.020	14	9	-5
Dumbarton	0.009	0.014	15	17	2

Ethnic Minority Proportions

Travel to work area	Proportion		Rank		Rank Change
	2001	2011	2001	2011	
Glasgow	0.438	0.406	1	1	0
Greenock	0.403	0.377	2	2	0
Dundee	0.384	0.356	3	4	1
Irvine and Arran	0.361	0.322	4	5	1
Edinburgh	0.360	0.360	5	3	-2
Dunoon and Bute	0.355	0.304	6	6	0
Campbeltown	0.344	0.292	7	8	1
Lanarkshire	0.343	0.300	8	7	-1
Dumbarton	0.328	0.291	9	9	0
Wick	0.323	0.262	10	13	3
Kirkcaldy and Glenrothes	0.320	0.280	11	10	-1
Ayr and Kilmaronock	0.313	0.273	12	12	0
Hawick	0.310	0.275	13	11	-2
Eilean Siar	0.298	0.228	14	24	10
Falkirk	0.294	0.244	15	16	1

Proportion of Households not owning a car

Theories – Relationship between the physical, the social, and the economic

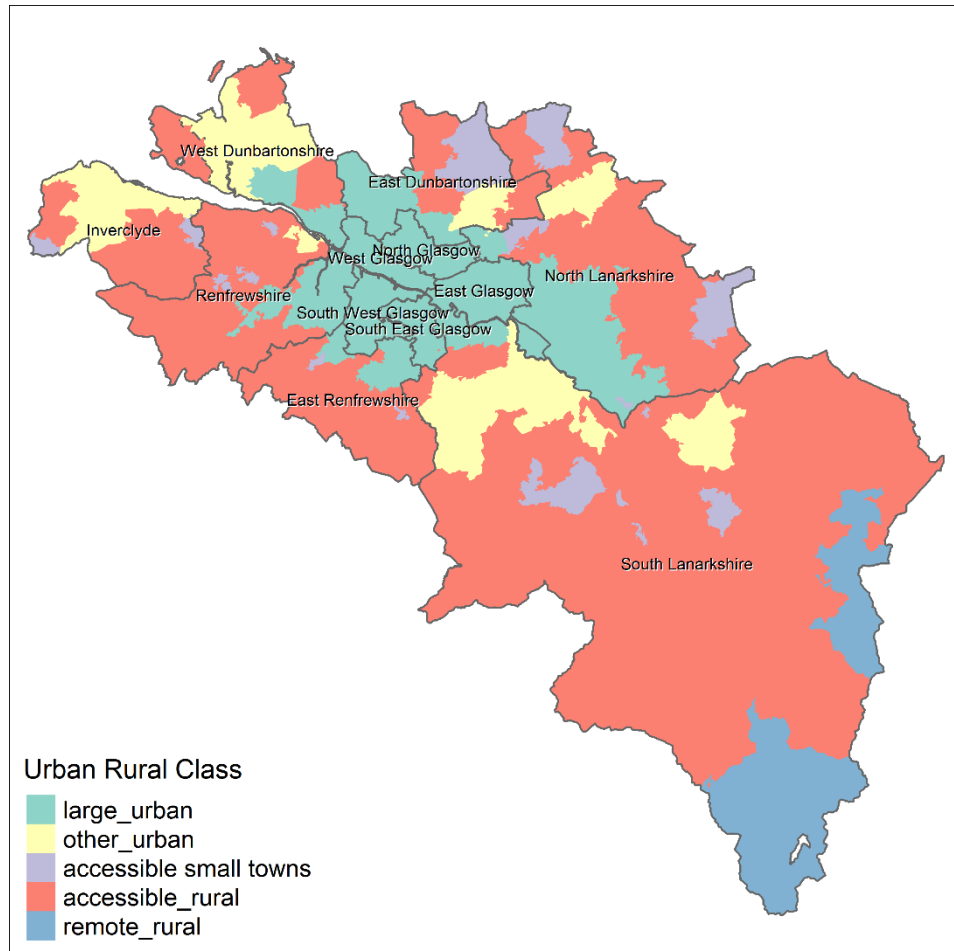
Travel to work area	Proportion		Rank		Rank
	2001	2011	2001	2011	Change
Glasgow	0.426	0.453	1	2	1
Edinburgh	0.422	0.465	2	1	-1
Greenock	0.382	0.393	3	3	0
Dundee	0.346	0.338	4	4	0
Dunoon and Bute	0.338	0.331	5	5	0
Dumbarton	0.299	0.293	6	7	1
Hawick	0.293	0.304	7	6	-1
Aberdeen	0.268	0.279	8	8	0
Campbeltown	0.260	0.243	9	10	1
Oban	0.259	0.245	10	9	-1
Lanarkshire	0.225	0.232	11	11	0
Kirkcaldy and Glenrothes	0.224	0.226	12	12	0
Falkirk	0.222	0.225	13	13	0
Galashiels and Peebles	0.215	0.218	14	14	0
Stirling and Alloa	0.211	0.204	15	17	2

Proportion not living in a house/bungalow

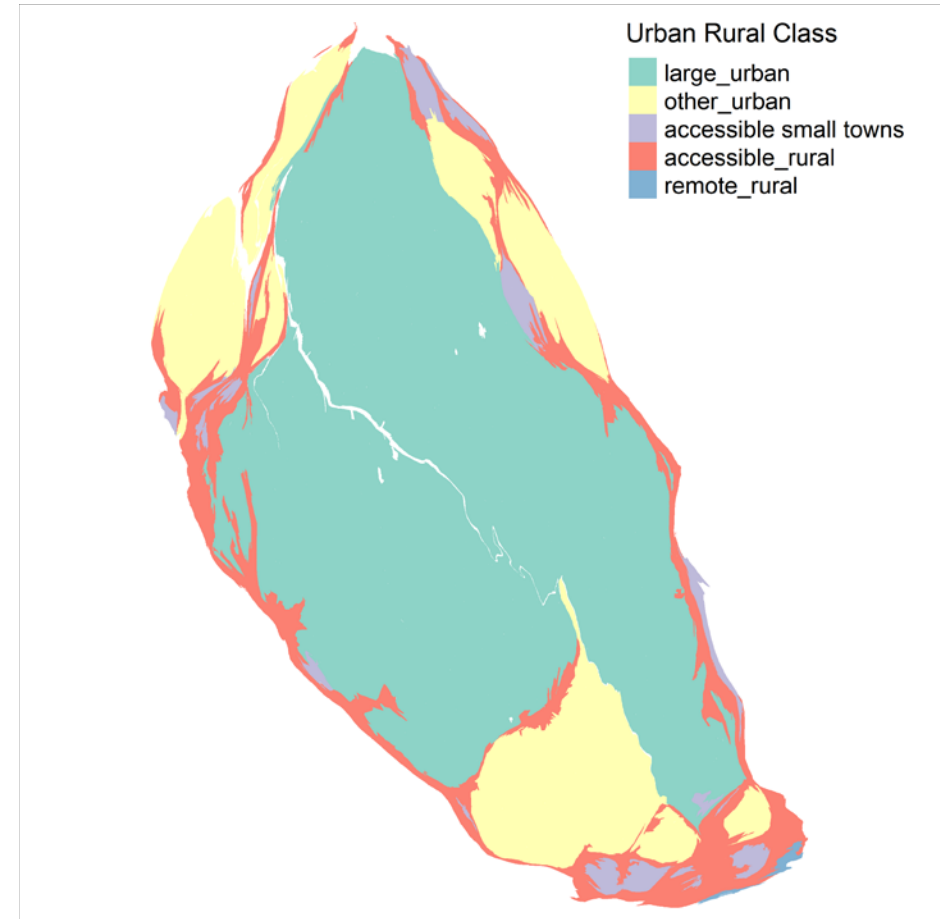
Travel to work area	Proportion		Rank		Rank
	2001	2011	2001	2011	Change
Glasgow	0.553	0.605	1	1	0
Edinburgh	0.543	0.585	2	2	0
Dundee	0.527	0.584	3	3	0
Greenock	0.507	0.567	4	4	0
Dumbarton	0.499	0.538	5	6	1
St Andrews and Cupar	0.493	0.557	6	5	-1
Eilean Siar	0.487	0.510	7	20	13
Aberdeen	0.487	0.523	8	10	2
Irvine and Arran	0.483	0.536	9	7	-2
Lanarkshire	0.483	0.535	10	8	-2
Dunoon and Bute	0.481	0.514	11	14	3
Wick	0.477	0.512	12	18	6
Kirkcaldy and Glenrothes	0.475	0.525	13	9	-4
Invergordon	0.475	0.512	14	17	3
Shetland Islands	0.473	0.503	15	22	7

Proportion who are not married

Methods – Definition of Greater Glasgow Used



12 Scottish Community Health Partnerships (CHPs)



(Link to Health & Wellbeing Survey?)

Methods – Diversity as entropy

- Shannon's Diversity Index H

$$H = - \sum_{i=1}^R p_i \log(p_i)$$

R : total number of groups

P_i : Proportion in area who are group i

- Ecology and information theory
- High segregation = low diversity
- Values depend on R
- Calculated for datazones (Scottish LSOAs)

Methods – Data and variables used

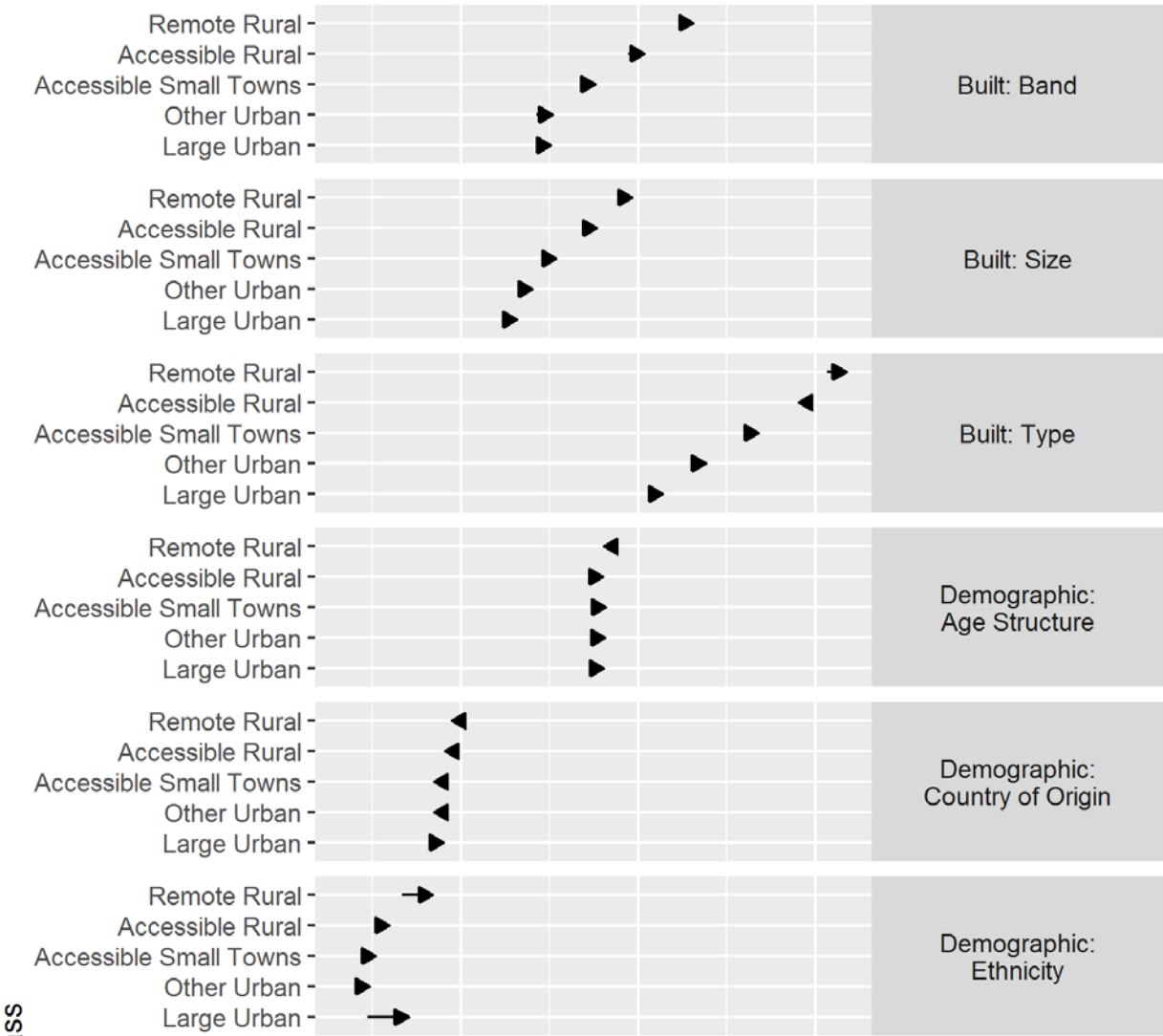
- **Data sources:** 2001 and 2011 censuses (mainly)
- **Variable types:**
 - Built environment
 - Council tax band
 - House size (number of bedrooms)
 - Type of building (house, flat etc)
 - Demographic:
 - Age structure (males, female, older, younger etc)
 - Country of origin (English, Scottish, non UK etc)
 - Religion (Catholic, Protestant, other Christian, Non-religious, other religion etc)
 - Economic:
 - Economic Activity status
 - Industry of employment
 - Highest educational qualification
 - Socioeconomic classification
 - Other:
 - Land use (occupied/vacant land parcels)
 - Tenure (Owned, rented, social rented)
 - Building use (residential only, business, mixed) – attempted from PAF but only for one year

Methods – Data and variables used

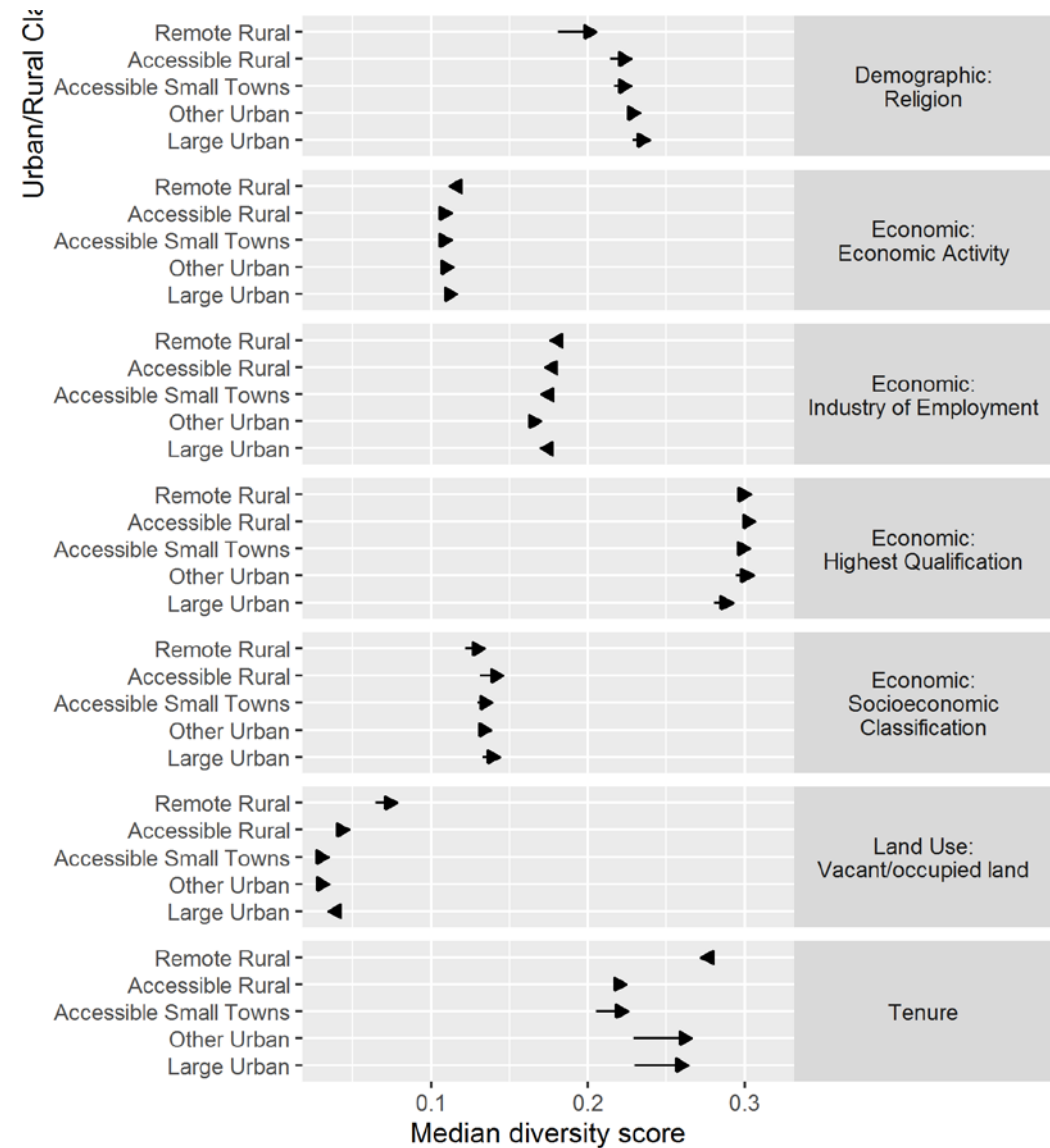
- Grouping variables
 - Urban Rural Classification
 - Distance from city centre
 - Population density
 - Deprivation using SIMD
- For UR class, median H scores are calculated for 2001 and 2011
- For other (continuous) variables, a non-linear smoother is used

Results

Diversity Change by Urban/Rural Class



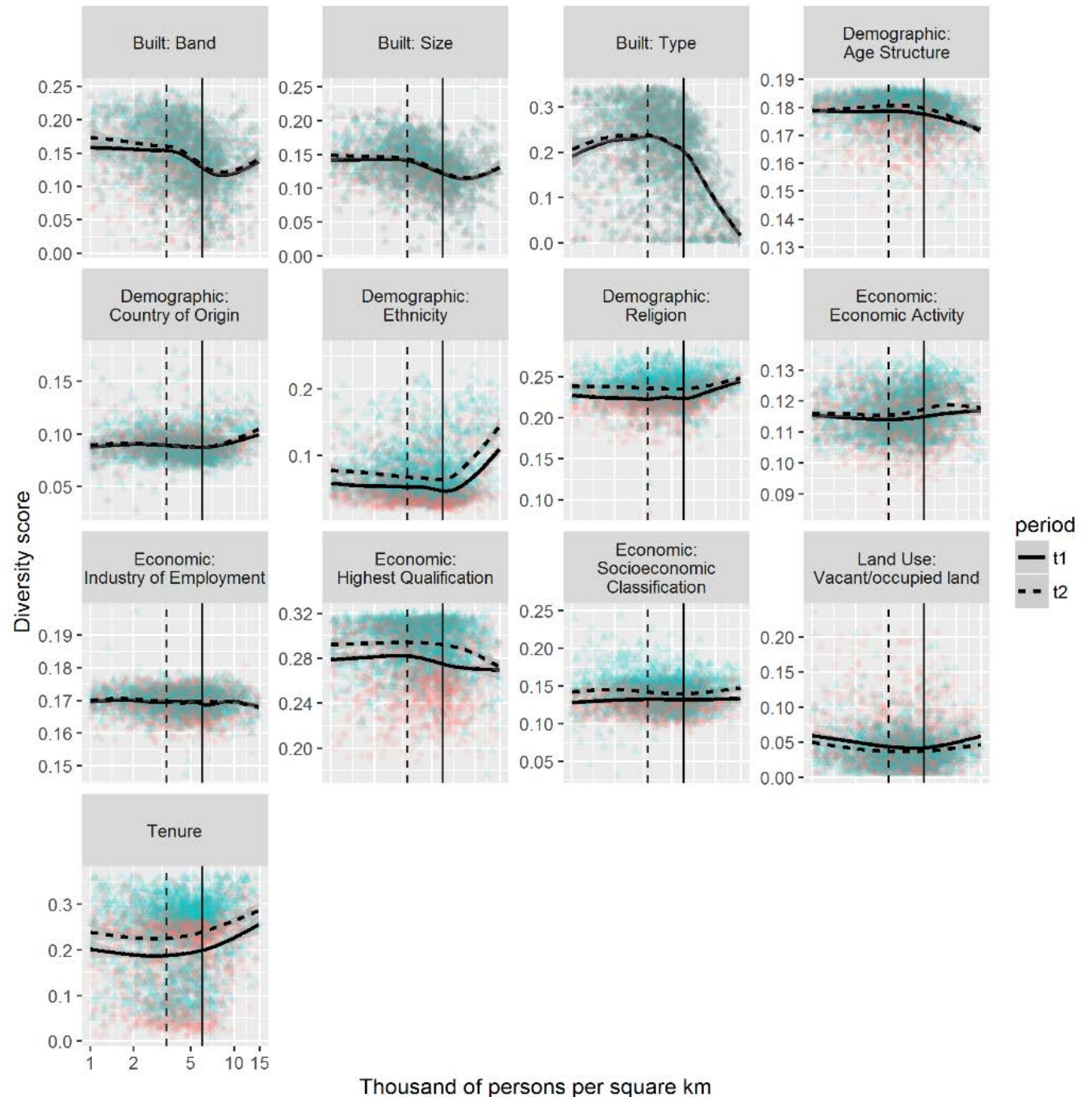
SSR



Results

Diversity by population density

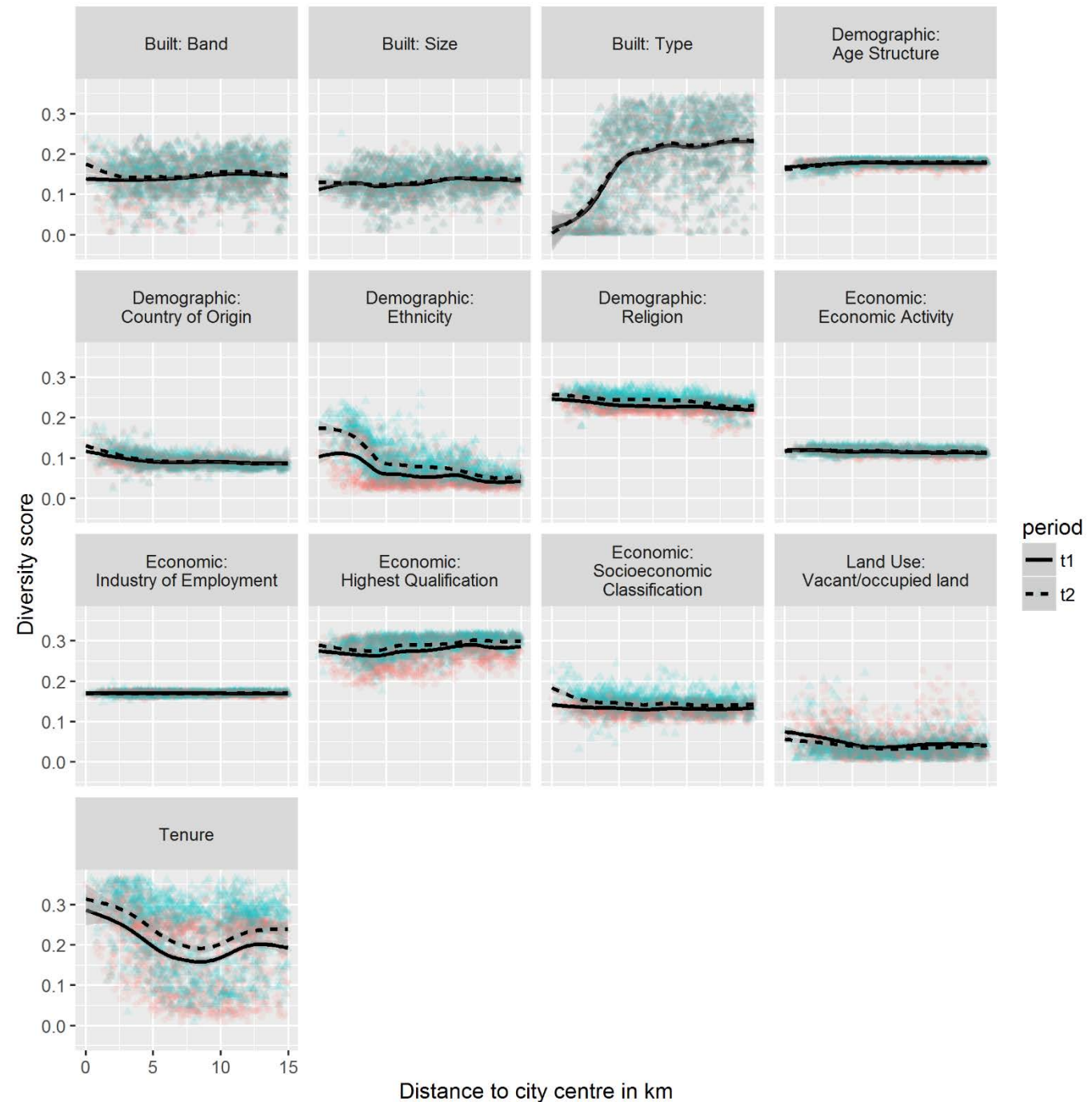
- Vertical dashed: 3.4k/km²
 - Greater Glasgow average
- Vertical solid: 6.0k/km²
- Ethnic, built, (tenure)



Results

Diversity by distance to city centre

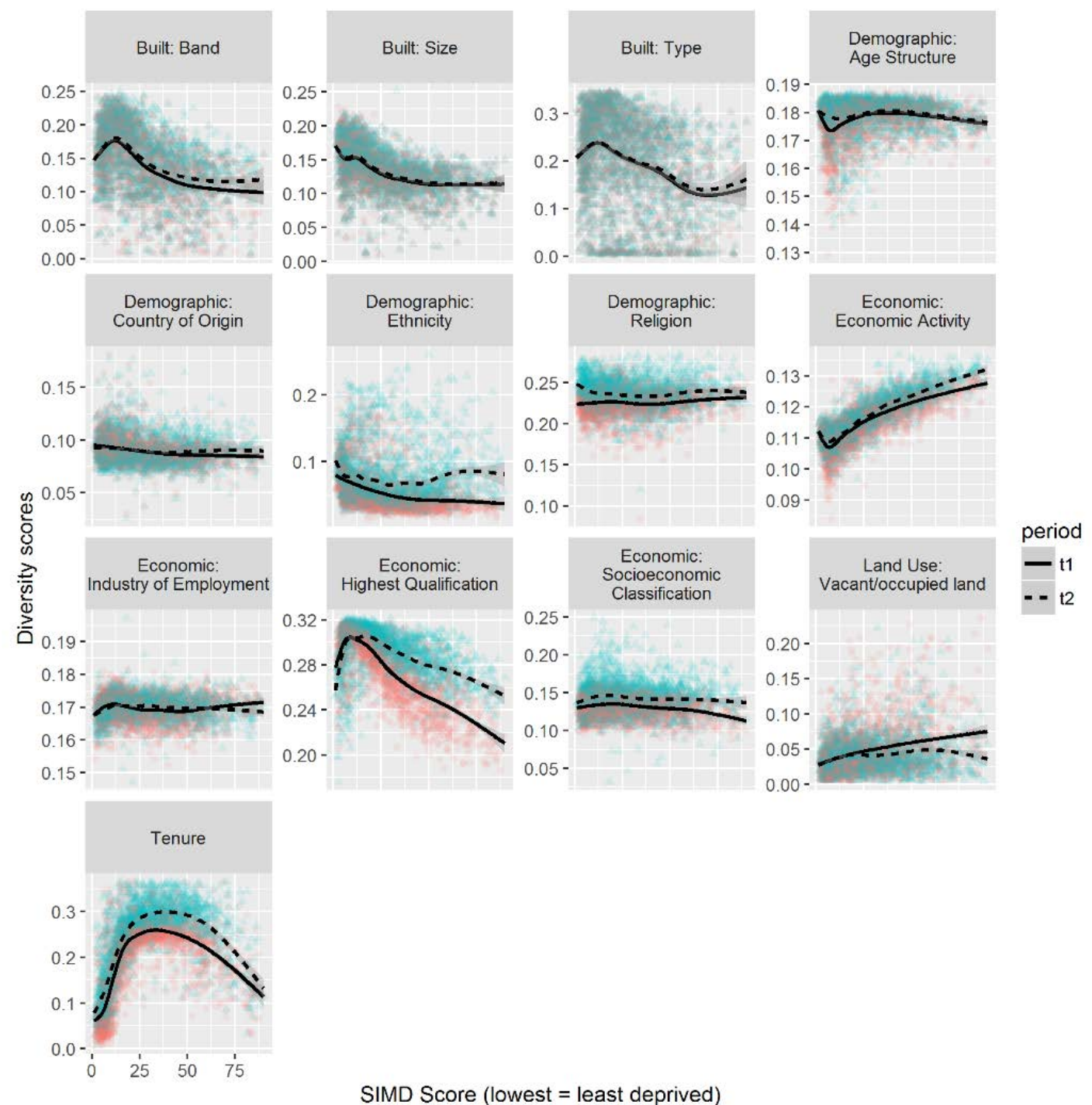
- Tenure, built, first 5-8 km



Results

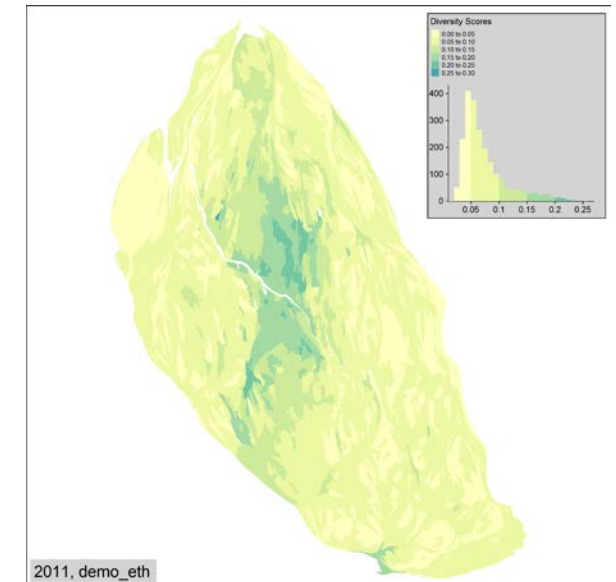
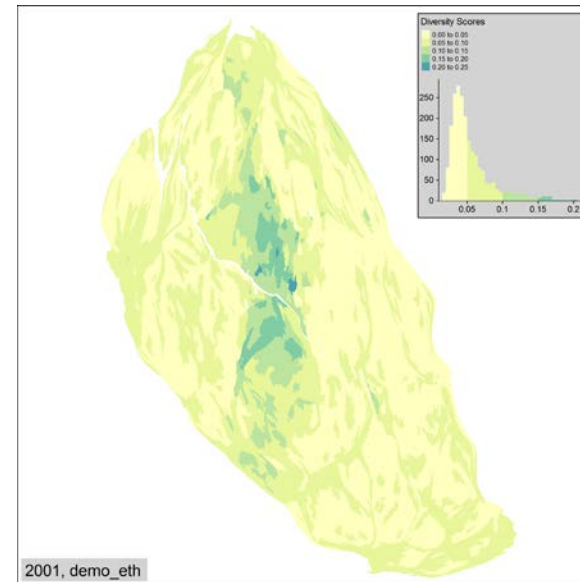
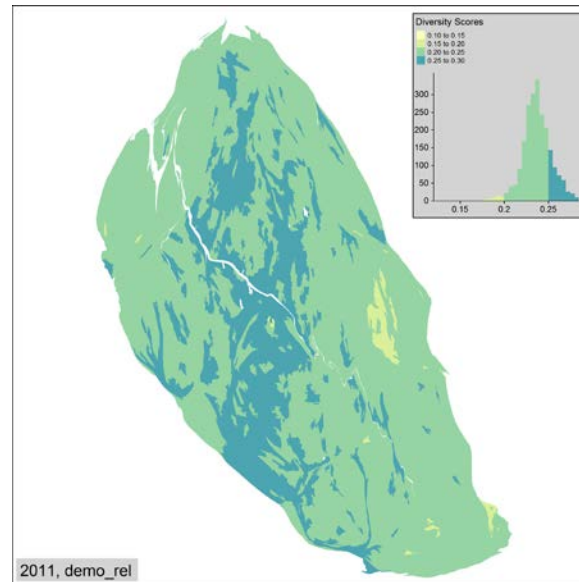
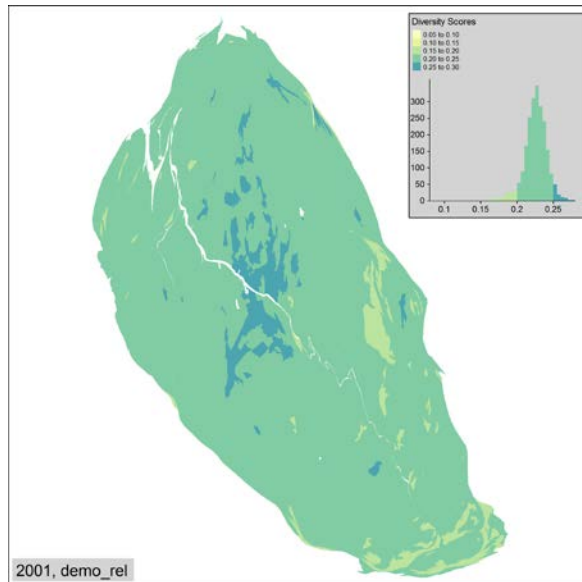
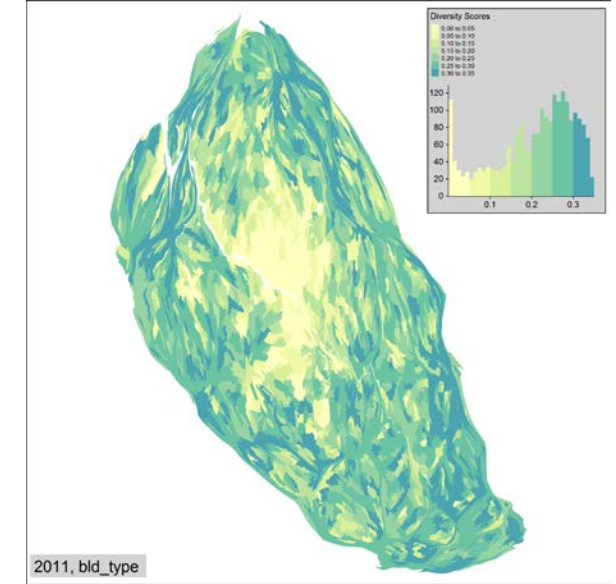
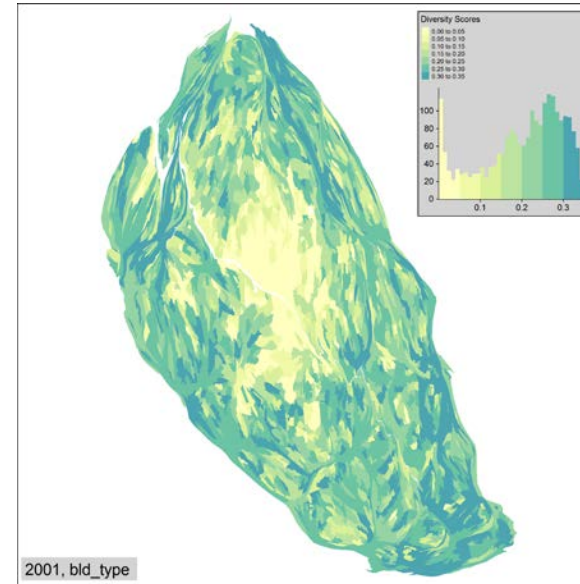
Diversity by SIMD

- Nonlinear relationships
- Tendency to more diversity
- Falling land use 'diversity'
- Ethnicity: Greatest increase in least deprived areas



Selected maps

- **Building type, Ethnicity, Religion**



Discussion

- 2001-2011 is a period of large scale demographic change in Scotland as elsewhere in UK
- Cities are magnets for migration
- Large increase in ethnic minority population and diversity in Glasgow
- Large increase in tenure diversity (more renting?)
- Greatest increases in ethnic diversity in areas with lowest housing stock diversity
- Increasing population size through migration
 - Reduced average age, better average health, better qualified?

Discussion

- Important density and distance nonlinearities
- High density, high centrality -> high diversity of people
- 'Kink' around 6000 people/km²
 - Network effects/agglomeration economies?
- Distance within 5-8km: different relationship
 - i.e. around 1 hr by foot/cycle/public transport
 - Jesse Ausubel
 - distance defined by time not space ('20 minutes away')
 - 'Fixed' time-travel preference, regardless of mode of transport
- Functional urban geographies
 - Community Health Partnerships?
 - Travel to work areas? (Dominated by car owners?)
 - Mode-specific TTWAs? (Distance/hour)
 - Amenity-specific TTWAs? (Mixed use & accessibility)

Next steps

- Associations between diversity and:
 - Health (Walsh et al 2016)
 - Economic development
 - Demographic change (including fertility)
 - Educational outcomes
 - Happiness
- ‘Natural Experiments’
 - Effects of regeneration (GoWell)
 - Generalisability to other cities

Thanks for listening!

- Analyses available from:
 - <https://github.com/JonMinton/gowell>
- Diversity maps from:
 - <https://github.com/JonMinton/gowell/tree/master/maps/diversities>
- Email: jonathan.Minton@Glasgow.ac.uk